

AVIATION WEEK

APRIL 4, 1949

A MCGRAW-HILL PUBLICATION



It gives the Cutlass an edge


A heavy, super-fast ship like the Navy's new XF7U tailless twin-jet fighter needs a plus in rugged landing-gear equipment. That's why it is fitted with Goodyear tires, tubes, wheels and brakes. The extra stamina of Goodyear tires and tubes—the extra strength of Goodyear lightweight magnesium alloy wheels—the

extra braking power of Goodyear self-adjusting Single Disc Brakes—give the Cutlass a decided edge in safety in making quick, sure stops. For complete information about these and all other Goodyear Aviation Products, write: Goodyear Aviation Products Division, Akron 16, Ohio or Los Angeles 54, Calif.



MORE AIRCRAFT LAND ON GOODYEAR TIRES, TUBES,

WHEELS



...no control system
is better than the
company and the
engineering behind it



CREATIVE ENGINEERING



MEMBER OF THE HONEYWELL ELECTRONIC AUTOMATIC STAFFORDS FOR ALL AIR NAVIGATION SYSTEMS



THIS IS THE LIFE

The useful life of your machine depends largely upon its bearings. That emphasizes the importance of selecting New Departure.



NEW DEPARTURE BALL BEARINGS

Nothing Rolls Like a Ball

NEW DEPARTURE BEARINGS MANUFACTURED BY NEW DEPARTURE, CHICAGO, ILL.



Airlines fly on *Good Groundwork*

✦ Commercial airline profits are made in the air...and good groundwork is in the factories and in the hangars where more than 100,000 technicians, bus time on the ground.

✦ It's the maintenance man's good groundwork is the factor that keeps the aircraft itself up to take off on schedule...and Sperry's good groundwork is the laboratory and in the factory helps him do his job even better and quicker.

✦ Every piece of Sperry mechanical equipment is engineered and manufactured to give the maximum of trouble-free hours in the air...and for easy accessibility and servicing on the ground at the regular

scheduled release overhaul periods.

✦ To make servicing of Sperry products still easier for the maintenance crew, Sperry engineers special training schools. Here the aircraft bay maintenance personnel learn to service Sperry equipment and teach others in its best use...all to insure more efficient and more economical operation.

✦ And in the field, Sperry Service Engineers themselves are always on call whenever, wherever service is

needed. Most of these men are graduate engineers. Their main job is to help the customer by making sure that his Sperry equipment and its installation give him the best possible service.

✦ Meanwhile, Sperry research and engineering look to their Field Service Engineers and the many Sperry maintenance men serving as customers for the vital performance data that help Sperry build new and better aids for aviation.



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Weather Reports

Out of the long-standing gripes of the Air Transport Assn. and Air Line Pilot Assn., is the inaccurate weather reports on terminal conditions issued by local observers at control tower per se.

To improve operational efficiency in bad weather, reports on the Beclin with new time weather observers is based on the opposite end of scale operational runway to give up-to-the-minute reports on actual conditions over the end of the runway—the weather the pilot is expected to meet.

Ground Control

Another significant contribution to the science of air traffic control is coming out of operational experience on the Beclin with the indication that as high density traffic in bad weather must be controlled completely from the ground.

Bad weather traffic on the Beclin with is under strict ground control from takeoff to landing and traffic controllers who reported this high density, instrument weather traffic pattern are convinced that there is no other way to handle it with as high a safety factor. Both Air Line Pilot Assn. and individual airlines can be expected to put up a strong fight against strict ground control of airline traffic by a single agency.

Power Switches

Current debates in Air Force top levels over engine needs of turboprop and turbopump have confused many lawmakers all the way from airplane and engine producers down to small accessory makers.

USAF top planners have made one complete swing of the pendulum from turboprop to turbopump and now back to turboprop but the issue on stage of the latest powerplant decisions hasn't yet tilted down to the lower accessory levels.

Good example is the Boeing B-52, originally a turboprop design that was recently switched to turbopump. USAF cancelled production of the Wright T35 turboprop scheduled for the B-52, but construction has not yet been ordered of the B-52 power switch.

Shop Critics

Mild criticism of airplane manufacturer workmanship has been channel-

NEWS SIDELIGHTS

Standard Cockpits

Wishes for stronger pressure from Civil Aeronautics Board and Military Air Transport Service for standardized cockpit layouts on U.S. airline transports.

Much of the exceptional safety record on the Beclin with is credited to the standardized C-54 cockpit arrangement that enables replacement crews to function efficiently without detailed checklists. Air Line Pilot Assn., also pushing for standardized transport cockpits, found not only that two two U.S. airlines have the same cockpit layout for the same type planes but that one airline has four different cockpit arrangements in its own fleet.

Pilots are also bawling for simplified cockpit engineering that designs a cockpit around the pilot rather than squares the pilot into space left over after all gauges and instruments are installed.

In 20 years both with and without good reason but it should be a major concern of the later that the same type planes are being registered today. In their electrical connections, poor wiring, bad wiring, obviously advanced wiring of hydraulic and fuel lines, inefficient duct wiring, etc., all must be upgraded and training of shop personnel who are employed today in the industry.

Airlines quarrel little today with the engineering design features of new aircraft but point out that most, if not all, of the advantage of such progress is lost when the installers in deeply inadequate Air Force industry have been fully competent to field service changes, upgrading and replacement of such items but this results in enormous expense and wasted time that could have been saved by simply doing the job right in the first place.

At one airline engineer points out: "We've been using solder for 30 years so I don't think it's simply a problem of control education."

Lightplane Routes

Legislation opening Post Office business to lightplane airline operation has been added by the Department and is expected to die through Congress with out opposition.

It would remove the present barrier to air mail service on the air. State routes—comparable to truck routes—the Department can operate on a contract basis.

Department could let air State routes contracts only be given out by the Department awarded by Civil Aeronautics Board.

Chairman Tom Murfin (D, Tenn.) of the House Post Office and Civil Service Committee has introduced the legislation, now pending before his committee.

Flight Engineers

In contrast to their original bitter battle against flight engineers, airlines generally are pleased now with the addition of a third man in the cockpit. He has proved a tremendous help in minimizing errors by providing a second set of eyes to detect difficulties that are not obtained from regular pilots in the past.

The airlines are also getting the flight engineers to work on the ground, where he serves as a vital crew chief during loading and unloading of cargo and servicing of the airplane. One unexpected quality in the flight engineers, surprising airlines in emergency conditions, has emerged earlier in the form of inexperience on the part of the third man in the cockpit.

Flight engineers apparently have finished engines, shut down cabin pressure turbines and out of business that have flown out at high altitude in only fractions of a second after the dual indicator malfunctioning and substantially faster than pilots and engineers have demonstrated. Airlines generally find the "third man" has proved money well spent.

FEIA vs. ALPA

A jurisdictional battle may be in offing between the Flight Engineers International Assn. and the Air Line Pilot Assn. over engineering flight engineers.

FEIA has a charter from the American Federation of Labor giving it the sole right to organize flight engineers. Yet ALPA organizers are already organizing their group. Dave Schick, boss of ALPA, also an AFL affiliate, is reported to find that his union's charter gives it the right to organize all airline flight personnel. And ALPA's charter was granted in the mid-thirties, while FEIA has just completed its organizational meeting.

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AVIATION CALENDAR

Mar. 8—International Air Transport Association (IATA) annual meeting. New York, N.Y. (Continued from page 10)

Apr. 10-12—North Atlantic Treaty Organization (NATO) annual meeting. Washington, D.C. (Continued from page 10)

Apr. 11-13—Annual meeting of the International Association of Airline Pilots. New York, N.Y.

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Torrington Needle Bearings Specified For Lighter Design and Longer Life In Indian Motorcycles



The new **Arrow** and **Scout** Motorcycles are designed throughout for lightness, power, safety and economy for Indian Motorcycle Company. To withstand stress shock loads, reduce friction and ensure longest design, Indian specifies Torrington Needle Bearings—22 in the Arrow and 24 in the Scout.



Needle bearings take the job of rough riding at high speeds with the new wheel hub (above) and the front wheel hub. With their full complement of needle rollers, Needle Bearings take less space and provide higher load capacity than any other comparable substitution bearing.



More horsepower per pound is delivered by the new Indian Power Box in tandem with 22 Needle Bearings on the transmission. Two Needle Bearings on the main shaft—two standard rollers, one offset roller with the standard oil channel present in behind them.



Manufacturing economy is secured by the easy installation of Needle Bearings in simple, easily-adjusted housing. Needle Bearings mean operating economy—no maintenance, no oil leaks, no vibration. That economy indicates these off-road bearings will serve the life of the motorcycle.

Lightweight design, high capacity, long service life and economical production can be yours with Torrington Needle Bearings. Our engineers will be glad to help you adapt these compact satisfaction units to the requirements of your equipment. Write to today: The Torrington Company, Torrington, Conn., or South Bond St., Ind. District offices and Distributors in principal cities.



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PLANE FAX

Avoid engine failure during take-off

Proper winging is a "must" for safe take-off. Don't take chances on a cold engine that doesn't "rev up" on the ground. Engines warm up faster with Chevron Aviator gasoline without vaporlock. That's because the premium quality fuel is scintillated by blended with just the right amount of light fractions for extra power and peak performance under all conditions.



A page of service tips for private flyers and fixed-base operators

Four quick do's and don'ts in case your engine conks out during take-off.

- ① Pick a spot—fast—for a forced landing
- ② Get the nose down



- ③ Don't bank sharply
- ④ Don't stretch the glide



Compute fuel consumption with your flight indicator

Your handy little flight calculator helps you work fuel-consumption problems as you work time, speed and distance problems. Simply substitute gallons for miles, and gallons per-hour for miles per-hour. If you haven't received your calculator yet, drop in to your nearest Airport Dealer for your free copy now.

"We take better care of your plane"




Standard Oil Company of California

NEWS DIGEST

DOMESTIC

Flight Engineer International Association Executive Board (Pittsboro, N.J.) president, William Crawford (American Overseas) executive vice president, and Sidney Carter (TWA) secretary-treasurer at its organizational meeting. Officers will serve for balance of year. Next meeting is slated for December.

Port of New York Authority negotiations with airlines serving New York City took favorable turn last week under guidance of New York Supreme Court Justice Thomas Call. Both sides say peace hopeful of early settlement.

Dr. Carl Albert W. Stevens, co-founder of world's oldest medical school at Letterman General Hospital, Redwood City, Calif., at the age of 63. On Nov. 11, 1915, Col. Stevens and Capt. Cyril A. Andersen married from Rapid City, S. D., in a fine ballroom and received 72,195 ft.

Gen. Billy Mitchell's papers, including letters, diaries, photographs and manuscripts have been deposited in the Library at Congress, Washington, D. C., as a gift to the nation from Mrs. Thomas Belling Byrd, Mitchell's widow, and her children.

FINANCIAL

Bonny Airplane Co. reports profit of \$1,715,908 for year ended Dec. 31, 1948, on income of \$1,739,664. Company wrote off \$7.2 million of a loss on the Stinson program project that is expected to total \$16.5 million. Ending at year-end was \$445,741,875, of which about \$35 million was unaccounted.

American Airlines reports loss for 1948 of \$2,894,000, or revenues of \$89,236,000, without effect of temporary and one year of 1947. Profitable operations in the last three quarters could not overcome first-quarter loss of \$4,265,000.

Western Air Lines reports profit of \$194,764 for the year ended Dec. 31, 1948, on revenues of \$10,465,218. Company had loss of \$79,456 before tax adjustments.

FOREIGN

Rexin has awarded the Order of Azules Nacionalis (Tupiza), for Soviet's leading aircraft designer. Gost was made an Tupiza's 60th birthday anniversary. He has been co-ordinated with Russian aviation for 48 years.

For American-Cross Airlines, for competing five years without an accident, received a special award from the latter American Safety Council.

INDUSTRY OBSERVER

Witch for a growing trend toward Delta wings on supersonic interceptors. Current has a new Delta wing intercepter project for the U.S. Air Force based on initial flight experience with its Model 7002 which is flying again at Mexico after adjustments to its elevon controls. Douglas also has a Delta wing design in the mill for a Navy intercepter powered by turbo turbojets. Top British designers have also indicated that is the direction they are trending for aircraft with speeds up to Mach 1.5.

Glenn L. Martin Co. is still waiting on the prototype of the XM-51 Air Force bomber at its Baltimore plant. It will be classed as a "medium" bomber according to current USAF designation.

Rolls-Royce Corp. claims two successful flights for its helicopters. A five-place M44 model built for the U.S. Air Force was clocked at 113.9 mph. over a measured course at Niagara Falls airport. This better the previous unofficial record of 151 mph. set by a Pinner M44B-1, an experimental seven-place model built for the Navy. A Bell Model 47 two-place helicopter normally set an unofficial altitude record of 14,570 ft. for non-supersonic engines.

Selenia, the Belgian airline, reports the following new equipment required last year: three Douglas DC-6s, six Cessna-Learners, three Cessna C-75s for operations, and five more for spare parts consolidation, and three de Havilland Doves, for operations in the Belgian Congo. Lightplane sales in Belgium were primarily two with one Aeromac, ten Piper models and two Cessna sold during the past year by local distributors.

KLM, the Dutch airline, is shipping for an additional 30 two-engine transports. KLM has taken delivery on seven Cessna-Learners for its European service and expects to get five more during 1949. Glenn L. Martin Co. and South Aircraft Co. of Sweden are competing for the new KLM sales with the DC-6 and the Scandinavia respectively. KLM has taken delivery on six Douglas DC-6s for its South American and South African service and two more Lockheed Constellations for the Sahara run.

SAAB now has orders for 24 of the Scandinavia transports from ABA (Aircraft), seven from DCE (Dansk) and seven from DNL (Norway). SAAB hopes the scheduled deliveries will be made in 1949. SAAB is only into the American market. SAAB is selling for a U.S. price of \$218,000 of the proposed new exchange rate. This is about half the current price for new U.S. two-engine equipment.

Aquatic, Inc., Wilmington, Del., reports that it is bringing prototype of new executive-type Amphibia (Avario Week, Feb. 19), is negotiating for financing with Texas oil interests. If successful in raising capital Aquatic probably will seek an agreement for Bellanca Aircraft Corp. to produce the plane.

Spectra Aircraft Co. has extensively revised and improved its executive transport and expects to put it into production if when market conditions justify. Plans have been down more than 400 lbs.

Latest reports on British turbojet development indicate the following new model: Rolls-Royce Avon (RA-1 and RA-2), combined power rating new model of the de Havilland Goblin (DGN-4), latest version of the Rolls-Royce Nene (RN-1), rated at 5900 lb. static thrust, and the Armstrong Siddeley Adolfs, developed from the Siddeley Pegasus, rated at 1955 lb. static thrust. The Bristol Siddeley Ghost (DGT-2) has been fully type-tested and is rated at 4450 lb. static thrust.

Navy bombers and a guided missile attack as a system for their attack on the fleet during Caribbean maneuvers. Defending Navy fighters were able to break up the missile attack but it diverted their defense to enable the Lockheed T-28s to slip in for their strike at the Navy destroyers.

figure out in procurement law, be it large or small, would be managing and controlling to ensure persons in it would be able to carry out the small or too large in any given year, in comparison to the amount of procurement, then determined to be proper and necessary."

Research and Development. Budget Bureau urged that the blanket authority for long-range USAF research and development programs be eliminated. The General Accounting Office has ruled that authority appropriations not obligated during the year for which they are made is expended within three years must revert to the Treasury. Budget Bureau's Director Frank Pace agreed that the availability of funds for such projects should be specifically provided for. He said "A legislative provision fixing the availability of appropriations is not necessary. It would be possible to achieve the same result by directing the secretary provision into the language of the various appropriations which."

PAA, Grace Buy 48% of NAL Stock

A stock sale and equipment interchange agreement concluded last week gave Pan American Airways and W. R. Grace Co. control of National Airlines, which is Card American Board approved.

Under the agreement, Pan Am would own the additional long-range right for its planes to operate from New York to Miami over NAL's routes. Airways of Pan American-Graeco Airways also a path to the past could be opened over National's routes from Miami to Washington and New York.

The agreement was to be filed for CAB record last week. If approved, the four companies would be able to accomplish the purpose of the Bureau's recent investigation of National's stock structure. Additionally, it would give through-plane service from northeastern U. S. to South America.

The agreement signed by the four companies last week in Washington, is a modification of an earlier proposal by National to the Civil Aeronautics Administration (CAA, May 14). Under it PAA assumed a 30 percent stock interest in NAL and Grace 10 percent.

\$4 Million. No focus on amount of assets or number of shares involved was included in last week's announcement. But at the time the previous report was disclosed, it was indicated that National was selling a total of 491,000 shares of stock to PAA and Grace, that at the indicated stock price that would give NAL an additional \$4 million in new capital. The 491,000 shares would result in last PAA's Grace holding 48 percent, the proportion now officially announced.

RAF's Expansion Plan Disclosed

New jet night fighters to replace Mosquitos, twin-jet bomber near, jet fighter strength to be doubled.

By Frederick R. Browner

(McGraw-Hill World News)

LONDON—Britain's Royal Air Force is on the verge of an expansion program aimed at filling present gaps in its arsenal of air weapons and adding substantial strength to its plane strength.

Silence of the RAF program. New twin-jet night fighter (left on the front left) has been ordered on quantity production as a replacement for the old four-engine Mosquito. Also, a new standard RAF night fighter, the new standard RAF night fighter.

New twin jet bomber. New twin jet bomber will go into quantity production at the English Electric Co. plant at Preston. Prototype will be flying this summer and is expected to be in the 500 mph class.

Doubling of RAF jet fighter production. Doubling of RAF jet fighter production (pictured production) will be absorbed by equipping RAF bomber squadrons with jet fighter, increasing their strength of jet fighters based in England and equipping RAF bomber squadrons with jet fighters.

Increase of the RAF budget to \$426 million for the fiscal year from Apr. 1, 1957 to Mar. 31, 1959. This compares with approximately \$350 million for 1954-55 for now aircraft compared with an estimated \$310 million for the next fiscal year.

The new jet bomber to be built by English Electric Co. is regarded as an advance step to 60 mph gap between present piston engine fighters plus are being 2-1/2 times that are required to fly the North Atlantic fleet and a series of advanced jet bombers projects now in the design stage at the Bristol and Handley Page plants.

Jet Puller—Secretary of State for Air, Arthur Henderson, revealed that the House of Commons that the RAF had deferred conversion to jet bomber types until advanced models of British jet engines had been thoroughly tested, apparently on the assumption that it would be easier to carry on in any future design than to jet engine development.

"At the end of the war we had two alternatives," Henderson told Commons. "We could have developed a new type of jet engine but we could have gone to jet development of an other piston engine type faster, better and more easily than the latter."

British Aviation. "The cause would have produced at great cost a member of only limited and very temporary value which would have become obsolete in a relatively short space of time. Development of such aircraft would have made demands on our limited technical resources which would have led to further delay in producing a really advanced type."

It was therefore decided that this was at a time when the international situation was viewed in a different light than today and when military expenditures had to be cut to a minimum in the interests of national recovery and economy as a long-term development of advanced jet bombers."

Henderson said the program for doubling strength of day-fighters spread over in Britain and equipping overseas RAF squadrons with jet planes would be completed by June of 1958. Henderson said the following additional aircraft types are now coming into operational service with the RAF: Victoria, medium transport which is a DC-3 replacement; Hastings long range transport replacing the York; and the Shackleton, long range Coastal Command reconnaissance bomber. Henderson indicated that the latest type Meteor jet fighter jet fighters would be replaced by a new generation of high speed jet fighters of much improved performance that are now in the development stage.

Aircraft Shipments

Personal aircraft shipments reported by 10 manufacturers to the Aviation showed production up about 18 percent over January with 726 shipments worth \$1,115,000 compared to 172 shipments worth \$864,000 during the preceding month.

Four plane models continued to lead in plane types by a 2-to-1 ratio with 157 four-place shipments compared to 73 two-place models.

Types continued to lead with 71 deliveries are again 1947 Cessna 440 wood-plane plane for the month. Aerocraft shipped 31 and Luscombe delivered 21 aircraft. Ryan shipped 21 Novartis and Beech model 14-Bassano. Other models included vortices Pellenes, Cessna, Beech, Pietenzo, two DPs, Luscombe and two TEMCO Swifts.

Aircraft Firms Reporting Profits

Six of eight manufacturers show earnings in annual statements, with only Convair and Martin in red.

Substantial military orders boosted six out of eight aircraft manufacturing firms into the black for the fiscal year 1946, according to annual reports issued recently.

Convair's operating profit for last year include United Aircraft Corp., Curtiss-Wright Corp., Douglas Aircraft Co., Lockheed Aircraft Corp., Republic Aviation Corp., Grumman Aircraft Engineering Corp., Glenn L. Martin Co. and the Consolidated Vultee Aircraft Corp. reported losses. However, Convair's 1946 loss was lightened by a last quarter report for the current fiscal year showing a net profit of \$907,284, the first profitable operations since the end of wartime production.

Details by company:

Lockheed

Profits of \$6,239,360 were reported for 1946 by Lockheed Aircraft Corp. Sales, including wholly owned subsidiaries, totaled \$125,623,700 (75 percent military). Lockheed's backlog at the end of 1946 was \$395,160,000 of which 91 percent was military.

Lockheed backlog includes 110 P-48 jet fighters, 907 P-80C jet fighters, 135 TF-80C, two-seater jet trainers, 107 F1V series patrol bombers, 39 Constellation for commercial and military operation and one Constellation scheduled for delivery to the Navy maritime patrol service.

Lockheed received net income of \$1,308,000 from its wholly-owned subsidiaries Lockheed Air Terminal, Lockheed Aircraft Service Corp., and Aircraft Engineering Corp. in addition to its holdings in the Pacific Finance Corp.

Dividend payments were resumed during 1946 for the first time since 1946 with payment of \$1.10 per share during 1946 and an additional 50 cents per share in March 1949.

Convair

Convair's net loss of \$11,976,795 for the fiscal year ending Nov. 30, 1946 was considerably higher than anticipated earlier due to heavy write-offs on the Convair-Lear (3,000,000) and Shuman general plane inventories (\$3,500,000). Convair also reported that \$750,000 in fees on B-36 production anticipated for fiscal 1946 was not received until the current fiscal year.

During the year Convair reported net of \$112 million which \$62 million were in the U. S. Air Force, \$51

million to the Navy (largely guided missiles), and \$20.2 million to the Convair Lear. Convair delivered 100 planes of which 92 were Convair Lear, 688 B-36 general planes, and the balance L-101 transport planes and B-36 bombers for the USAF.



FAIRCHILD GETS

Fairchild Engine & Airplane Co. will build 100 T-34 four trainers (three seats) for the U. S. Air Force at its Hagerstown, Md. plant. Convair is to make 18 additional T-34s under production is scheduled for the end of 1949 with USAF orders scheduled to begin flying the T-34 only in 1950. T-34 was originally developed for the Navy but the NAC-1 and features a stubbacktail USAF/Navy engine (below) in which fuel

► **Backing.** \$186 million—Backing of \$150 million was reported at the close of the fiscal year almost entirely in military business (\$115 USAF and \$35 million Navy). This does not include the second Convair order for 50 additional B-36 bombers and modifications on previously ordered B-36s, which boosted the backlog by \$86 million.

Board Chairman Floyd B. O'Brien reported that Convair has now absorbed all expected losses on the Convair Lear program including an unexpected \$12,450,000 in completing 170 of the transports and had made a profit of \$907,284.



TRAINER ORDER

per foot lower (10) line a distance which could. Fly instead of a minimum 400 feet to initial conclusion between these two aircraft models. The Fairchild trainer has a span of 41 ft., wings of 28 ft. and is powered by a 500 hp. Lycoming engine. Gross weight is 3750 lb., top speed 300 mph, service ceiling, 10,000 ft. and stall speed at sea level with flaps up about 60 mph.

for the first quarter of fiscal 1949 as sales of \$70,136,794. Convair's backlog at the end of the quarter was \$390 million including the additional 3-16 orders.

Orders declined at the Shuman division as told to Pope Aircraft Corp. for 100,000 shares of paper stock and paper equity to be used in the reorganization of Shuman plants by this company. The Shuman plant in Wayne, Mich., will be sold by Convair.

Cartus-IV right

Cartus-Wright Corp. reported a net profit of \$5.5 million on sales of \$11,747,027 for 1948. This compares with a net loss of \$1,565,258 on sales of \$85,161,888 in 1947. The corporation reported a backlog of \$13.2 million in unfilled orders as of Dec. 28, 1949. C-W President Wm C. Jordan indicated the corporation is placing its main emphasis on the engine and propeller divisions.

Wright Aeronautical Corp. is pushing development of turboprop, compound, turboprop, and piston engines with the propeller division working on engine engines for the military. Engines sales are about 85 per cent military. Budget capital sales in 1948 were on the 7100 2700 hp Cy-

clone 18 engine used on the Lockheed P-3V Navy bomber and Constellation transport and the Douglas Skyraider Navy attack plane units. Douglas also turned in new turnings more than half of the total propellers sold in military and commercial aircraft.

The corporation paid dividends totaling \$18,750,000 on class A and common stock during 1948. Two dividends of \$1 each were paid on common stock and one \$2 dividend on class A stock. On Feb. 25, 1949, directors declared a dividend of \$1 per share on stock to be paid in quarterly installments during 1949. A regular quarterly dividend of \$1 was also declared on common stock. Directors announced that the corporation intended to pay \$1 per share on common stock during 1949.

Douglas

Net profit of \$5,525,206 (49 percent of sales) was reported by Douglas Aircraft Co. for the first year ending Nov. 30, 1948. Sales for the year were \$118,501,347, about \$18 million below the 1947 level. Company backlog was \$73,000,000, an increase of approximately \$51 million over the previous year. USAF accounted for 43 percent of the backlog (principally for C-124 transport) with 46 percent in Navy

orders for the Skyraider attack plane units and the Skyhawk (F3D) jet night fighter. Douglas reported \$23 million in orders for space parts to defense and the military.

Cash dividends of \$5 per share were distributed to stockholders in record Nov. 3, 1948 with a quarterly dividend of \$1.25 per share declared on Feb. 16, 1949 in addition to a special dividend of \$2.75 per share.

Employment at Douglas' three plants has risen from a postwar low of 83,500 last July to 106,800. Bulk of Douglas production (Skinner and Skyhawk) is now at the St. Elizabeth plant with the C-124A work being done at Long Beach. Santa Monica plant is doing fabrication work for F3 Skyraider and development of the DC-6A freighter which is expected to be early this summer.

Martin

Loss of \$56,718,782 was reported by the Glenn L. Martin Co. for its 1948 operations. Martin had sales of \$72,636,572 for 1948 of which \$66,577,149 represented military business. Backlog amounted to \$108,000,000 as of Dec. 31, 1948.

The Martin Co. reported a profit on military business that was more than offset by losses on the commercial Model 2-2 transport program and the transport division. The firm has established a valuation reserve of \$12,750,000 to reduce 2-2's uncollectible on their extremely unreliable value. The sales possibilities of the 2-2's cannot be expected to improve until the main and cabin portion of the domestic airlines and dollar exchange stabilizes of foreign airlines improve, the company believes.

The 2-2 assembly line has been shut down until new orders to be received. Another reserve of \$2,800,000 has been established to cover estimated costs of manufacturers to existing 2-2's. Martin's remaining backlog on its R-2C losses is \$18,777,721 which is scheduled for repayment as follows: \$3,867,500 before Sept. 30, \$2,000,000 before Jan. 15, 1950, \$2,000,000 before May 15, 1950 and the balance before Sept. 30, 1950.

Republic

One of the most spectacular of last year's commodities was staged by Republic Aviation Corp. It not only turned in a profit for the first time since 1945, but virtually doubled its working capital, and set its subsidiaries to work and arranged to increase all of its subsidiaries at a profit.

On sales of \$49,816,036, Republic had an operating profit of \$2,825,394.

Federal tax total \$1,864,027 of this profit, the company was eligible to carry forward against 1949 tax liability part of its 1948 operating losses. Republic was a net profit of \$2,160,675.

Working Capital—At the end of 1947, Republic's working capital was down to \$5,475,719 (which included \$1,023,970 cash), including the credit to which the Section parent had advanced off the company's assets. As of Dec. 31, 1947, Republic also owed banks \$1,217,086, down on a \$57 million line of credit.

That's how that picture has changed. As of Dec. 31, 1948, Republic had working capital of \$6,893,415 (including \$1,653,516 cash). It had liquidated its bank loans, and had not borrowed since April, 1947. It had a profit last year, and it seemed the line of credit, this time for \$5 million, nothing had been drawn down as of the end of the year.

• **Stock Profit**—Republic brought Air credit Motion, Inc. shareholders of Republic's common for first aircraft, is order to establish a source of supply for Section power plants. When Air credit was sold for \$1.5 million last year, Republic had paid a \$2.8 million, 112,000 of which was charged against a reserve built up in cover Air credit's losses. Republic was released from the line amounting to \$156,661.

In 1948 Republic reduced to normal surplus the balance of its postwar emergency reserve amounting to \$3,251,328. This plan last year's profit, which earned surplus since 1919 up to \$6,431,262, as against \$99,162 as of Dec. 31, 1947.

Employment, 6000, Republic is working on 874 orders that have aggregated about 1000 planes, the current report states. Backlog of approximately \$22 million as of Mar. 1, 1949, will see production into 1950.

Grumman

Grumman Aircraft Engineering Corp. will make deliveries this year of the first production models of its T-37C Grasshopper, Navy amphibious plane, the company's annual reports reveals. Two prototype Grasshoppers are being equipped with an engine and landing gear under the help of the military contract. An order for a "limited quantity" has been placed by the Navy.

Grumman also has completed design of a "successor to the Panther," presumably the XF10F-1, which is being made only for prototype construction. First production Panthers—P-10F—were delivered late in 1948, the annual states, and production will accelerate this year. It is expected that the P-10F will be in Grumman's major product. The P-10F contract is scheduled for completion the middle of this year.

• **Widgong Dropped**—These Navy planes, plus the SA-16 Albatross for the Air Force, comprise nearly all of Grumman's current work. Regarding the company's commercial airplanes, the report states merely that sales of the Mulish amphibious "outboard" in 1948. The regular, four-place, outboard, which was discontinued last year, one of the planes being dropped in 1948.

Grumman's new aircraft work, aluminum canoes, dinghies and truck boats, however, the work looks better. The new amphibious products combined yielded only about 4 percent of Grumman's total business.

• **Still Profitable**—Grumman continued its profit last year, with a profit last year of \$1,933,311 on total sales of \$41,202,129. These are the highest figures since 1945. Working capital amounted to \$10,000,573 as of Dec. 31, 1948, net increasing to \$7,155,766. Backlog of some date was \$122 million.

United Aircraft

While reporting gross income of \$309,115,756, profit in excess of that for 1947 was reported by United Aircraft Corp. turned in a profit for 1948 nearly \$400,000 less than in 1947—\$1,843,714, an amount \$1,817,285. This was largely due to increased expansion and development costs.

Plant and facility expansion reduced corporation's working capital position, but still left United with a whopping \$84,802,574 in working capital. Investments in Dec. 31, 1948, were up to \$28,555,453, compared with \$18,417,534 in 1947, but about \$24 million of this figure was in connection with government contracts.

• **Expansion**—UAC's expansion activity has dominated the annual report. By the end of this year it anticipated that a \$20 million investment and expansion program will be completed.

As of Dec. 31, 1948, about \$7.5 million was spent on Pratt & Whitney's turbine laboratory. Albatross Standard had added 22,000 sq. ft. of floor space to its plant, Sikorsky had added 100,000 sq. ft., and the remaining 20 of various Grumman Wright to Dallas had been built finished.

The Dallas move is expected to be completed by July 1, and the Stratford plant has probably will be sold. It is a "successor to the Panther," with the general net owing about 15 percent. UAC already has started discussions with the government to prove the way for the sale.

United still has a reserve of \$59 million in 1948, with the company after changing this amount last year with \$1.8 million on the Dallas move. The corporation anticipates that the

reason will be exhausted by the end of this year.

• **Facts of Expansion**—The report indicates the scope of the heavy equipment expenditures run up by UAC since the end of the war are paying off. The J18 Turbo Vane (designed by Pratt & Whitney in 1948, which has made the company's other products) last year 150-hp turbofan unit at a state three-ring of 5000 lb. (Believes been on November 15 additions 70-hp new has on the first unit "complete work" of its own gas turbine engines. In the Sikorsky division, the Albatross rotor blades for helicopters has been brought along to the point where it is ready for limited production. And development of the Sikorsky HO4S is increased by 50 percent in production of hollow steel propeller blades.

United Aircraft had 25,431 employees in its payroll at the end of the year, working on a backlog totaling \$135 million.

Family Fare Plan Extended to June 30

Civil Aeronautics Board has granted to 12 domestic carrier appeal for an extension of first-of-the-week family fare plan June 30.

Whether the parties will ask for or whether CAB will seek further extension of the family fare plan through the summer is still to be decided. Some lines are not sure that the special tariff has so-called is a net revenue gain. Degree to which regular fare business has been diverted to the family plan is being studied by the CAB and CAB.

• **Traffic Level Constant**—But the carriers are in agreement that the plan has been a success in keeping traffic levels fairly constant throughout the week by increasing the annual Monday-Tuesday-Wednesday day. Perhaps, the plan's promotional benefits appear to be substantial, with all members of the family group becoming carriers of air transportation. The major benefit is a balance customer in a family today may be an individual full-time day traveler.

• **Midweek Airlines** has reported that for the 17-month period ended Feb. 27 of every other passenger carried during the first three days of the week traveled under the family fare plan. Another daily passenger mileage flown by MCA on Monday, Tuesday and Wednesday now exceeds the daily average for the latter part of the week, when traffic formerly was heavier.

Average passenger time made by family fare customers over MCA routes increased from 136 to 410 miles in the 17-month period. The number of regular passengers carried at about 300 miles.



NEW VIEW OF MEDICATOR

Several experimental model Martin P-400 Mustang Navy sub-surface attack plane is shown in test flight over Edmonds plant. Model features reflected test surfaces to accommodate better during landing and takeoff. Forward-downstream barrel is still in new engine previous installation of test equipment. Although two P-400 Wing Model engine has Mustang approx-

imate of two-engine design, in Office P-30 sub-surface engine is based on such surface to provide shock air intake, rapid climb and high speed acceleration during forward maneuvers. Schedule calls for 24 Mustang to be delivered to Navy during year P-400 has 12,000 and the balance before Sept. 30, 1950.



BASIC DESIGN of British Vickers Viking and Vulture has been adapted to...



... BOMBER TRAINER with tricycle gear, external bomb bay and longer nose.

New Bomber Trainer for Britain

LONDON—A new lease on life for the basic design of the Vickers-Armstrong Vulture is being given in the latest version of the plane, a bomber trainer for the RAF. It will have more advanced performance than the present bomber trainer adaptation of the Vickers Wellington.

External details have just been released and while no order for the production of the plane has been placed, it is probable that such an order will follow when Vickers-Armstrong's "Wendover" works reach up to present production of some 150 Vulture military transports for RAF Transport Command—about mid-summer of this year.

Changes of (rather substantial) size of the Vulture have been made, at least in the European area. British Airlines (Vickers) have put their existing four Vultures up for sale, following the example set some months ago by Aer Lingus.

Aer Lingus' decision reflected the improvement in the supply situation of DC-3 spare parts and the airline's desire to simplify its maintenance problem by standardizing on the Douglas plane. But the sale of the Vulture and

DDL's decision to sell, naturally, affects the Vulture's reputation.

► **Generalship**—The new plane, designated the "V" by the Ministry of Supply and Type 618 by Vickers, is a streamlined conversion of the standard Vulture, which was developed from the Viking. The latter was a pure transport, quick-change and drop-down structural fuselage, including its wing, from the Wellington bomber.

The plane is powered by two Bristol Hercules engines driving fully feathering, hydraulically operated, four-bladed airscrews. It is presently intended for day and night training of crews personnel and is fully provided with the most up-to-date equipment for this function.

Most noticeable new feature is the tricycle undercarriage. All units are now fitted with a Vulture single main wheel and, with all field forward construction. The wheelbase is 18 ft. 11 in. and the overall height of the aircraft on the ground is 12 ft. 9 in. (7.2 m).

The hydraulic nosewheel steering and the automatically operating undercarriage doors are similar to Vickers design. Vickers' first big plane with tricycle gear.

► **Block Bay**—Main fuselage deflector in the underwing bomb bay with a heavy armor's window. The bay door which was cut away for the glider towing role of the Vulture has been retained in the new trainer. The overall length is now 57 ft. 4 in.

The wing, with an area of 970 sq. ft. has a slightly greater span—54 ft. 11 in.—but is of similar construction to that of the Vulture. An entirely new nacelle and engine cowling are fitted, intended to provide easy maintenance. Vulture-type split flaps of increased area are added, the tail unit, controls and most other features are virtually the same as in the Vulture.

State Takes Control Of Aerovias Brasil

RIO DE JANEIRO—Aerovias Brasil, which flies routes throughout this country and to the U.S., has been taken over by VASP (Viação Aérea São Paulo), the last of the state government of São Paulo.

Marcia Ulysses Rodrigues, now VASP president, also is president of Aerovias. VASP acquired 51 percent of Aerovias' stock for an announced price of 25 million cruzeiros (about \$1,115,000). Aerovias owns more than 20 DC-4s and C-54s, as well as other equipment and installations.

► **Chase Run By TWA**—Started during the war, essentially to build airports, roads to the U. S., Aerovias Brazil was at one time run by TACA and later by TWA, before some Brazilian businessmen acquired control. It was recently nationalized by the third president of Brazil, Juscelino Kubitschek, who after leaving the office of President and Chief of State, but like many others in the eventful field, it had suffered serious financial difficulties.

VASP, which consistently shows a profit, hopes to put Aerovias into the black by reducing overhead on the new VASP airplanes has ordered flight in southern Brazil, especially the famous Rio de Janeiro São Paulo transport operation.

Previously Aerovias' two-night plane service to Miami will continue. Cruzeiro do Sul is the other Brazilian airline authorized to operate to the United States, with Pan American and Brazil as the two American lines in the U. S.-Brazil service.

GM Interest Bought

MELBOURNE—Ralph Roe, Ltd., British engine manufacturer, has bought General Motors' interest in Cosworth Motors Aircraft Corp., Cosworth Motors Holdings, G.M.'s Australian subsidiary, held 70,000 shares in the 94 million asset concern.

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The extreme heat generated in exhaust manifold systems, turbojet tail cones and similar installations create strength and secure problems in ordinary fasteners—problems that are solved by ESNA's New D-1200 Hex and Anchor Nuts.

These new nuts shown above on the turbine flange of the General Electric TG-190 retain their strength and locking torque characteristics even after exposure to 1200°F. They are readily removed . . . do not seize the lock as damage the threads.

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THEY ARE REUSABLE

ELASTIC STOP NUTS



OVER 100 TYPES AND SIZES IMMEDIATELY AVAILABLE FROM STOCK

AVIATION WEEK, April 6, 1949

the serendipity of predicting radiation maxima that define the ignition time lag when the ignition temperature is reached are probably the principal factors that provide the benefits to be obtained from high velocity temperatures.

► **Pressure Velocity Factor**—The increase in combustion efficiency with increasing inlet-air pressure shown in Fig. 2 is typical of the results obtained with all types of combustion chambers because the rate of chemical reactions increases with the concentration of the reactants, the improvement in the combustion process with increasing inlet-air pressure is consistent with the chemical ideas on reaction rates.

If a combustion chamber is operating on the doping portion of either or both the combustion efficiency temperature and combustion efficiency pressure curves, the reduced air temperature and pressures encountered in altitude flight can be expected to give lowered combustion efficiency.

An altitude flight ceiling is reached above which the combustion chamber fails to provide combustion gas at the turbine-compressor temperature required to operate the engine.

The relation in combustion efficiency with increasing combustion chamber inlet-air velocity shown in Fig. 3 is largely due to the decreased time a given mass of combustible mixture remains in the combustion zone to complete its burning.

At low velocity velocities there is sufficient time for the combustion to be completed before the addition of secondary air to the turbulent combustion chamber stops further reaction or the rest of the gas gets a shock. A secondary reaction in velocity at low velocity velocities will not adversely affect the combustion efficiency, as shown by the flat portion of the curve.

► **High Turbulence**—Whereas the rate of propagation of flames normal to the flame front in quiescent stoichiometric fuel vapors is about 1 ft per second, average gas velocities of the order of 250 ft per second through the combustion chamber are common practice in turbo and turbojet.

The high-velocity combustion is achieved in the turbojet by providing a combustion zone at the upstream end of the combustion-chamber liner in which the air velocity is less than the average air velocity through the combustion chamber at about 250 ft per second.

A high degree of turbulence is induced in the combustion zone to increase the interface between zones rich in fuel and zones rich in oxygen. A rapid mixing by diffusion of the fuel and oxygen molecules occurs, and an effective flame front many times the area of cross sec-

tion of the combustion zone is produced. With a high ratio of flame-front area to combustion volume, an extremely short displacement of the flame front normal to itself is required to consume the fuel.

► **Fuel Spray**—The evaluation of effect of fuel-air ratio on the performance of the combustion chamber is often obscured by the change in the characteristics of the fuel spray with the changing fuel-flow rate necessary to vary the fuel-air ratio.

The atomized experimental evidence, however, supports the following theory: Combustion proceeds most rapidly in stoichiometric mixtures of vaporized fuel and air. If continuous vaporization of fuel and intimate mixing with air can be achieved, then improvement in combustion efficiency should be obtained as the fuel-air ratio is moved toward the stoichiometric value.

However, stabilization of the fuel and the air is a formidable and it often the principal factor controlling the combustion process. At low fuel-air ratios a rapid fuel vaporization in a limited portion of the air flow is desirable to provide a local zone where most steady-state reactions can be established. A single drop provides a fine fuel vapor mixture with a small degree of penetration should therefore serve best at low fuel-air ratios.

As the fuel flow is increased with constant air flow rate, considerable time lags occur, and considerable time lags occur. Better results are obtained with a fuel nozzle that provides a conical fuel spray with greater penetration power in order to provide a large portion of the air with the fuel and to maintain the local optimum fuel-air ratio.

Experimental verification of this statement is shown in Fig. 4. As the fuel-air ratio is progressively increased the combustion is moved back in corner and corner fuel spray.

In the range, peak combustion efficiency generally occurs at fuel-air ratios less than stoichiometric. This shift in peak combustion efficiency to fuel-air ratios less than stoichiometric is attributed to fuel stratification.

With small fuel-air ratios close to stoichiometric, fuel stratification will give uneven zones in which the excess fuel cannot burn regardless of how favorable the conditions for combustion are otherwise.

Research leading to the development of methods for reducing the degree of fuel stratification may provide an increase from 10 to 25 percent in the temperature rise across the simplest combustion chamber.

► **Full Properties**—Early combustion chamber studies conducted under sea level conditions indicated that, except

for carbon deposition, there is little difference in the performance to be obtained from various hydrocarbons having a reasonably wide range of chemical composition and distillation characteristics.

However, when the combustion process was studied under simulated high-altitude flight conditions, when operation of the combustion chamber becomes marginal, the need for a stricter specification of the chemical properties of the fuel became evident; for example, straight-chain paraffin hydrocarbons gave better combustion efficiencies than their corresponding branched-chain isomers.

The order of the efficiency the fuel composition can make in combustion efficiency is shown in Fig. 5 for the straight-chain normal octane and its branched isomers, isooctane, both of which have about the same boiling point. An advantage of about 25 percent in the combustion efficiency is shown for the normal octane over isooctane at the higher air mass flow. Also, the straight-chain hydrocarbons are, to be preferred for their tendency toward low carbon deposition.

Differences in performance of the fuels based on their combustion characteristics and other physical properties can be eliminated to a considerable extent by the proper matching of the fuel-air ratio to the fuel.

Back to the current high-speed research in which the storage volume is limited, scope the further specification that the fuel shall have a high heat of combustion per unit volume. Where weight and air velocity are the critical factors, the heat of combustion per unit mass of fuel must be large.

The search for fuels that meet these requirements has led to the consideration of non-hydrocarbon fuels and the problem of monochromatic stability.

► **Study of Components**—Parallel with the direct experimental approach to the problem of improving jet-engine combustion by studying the combustion in actual chambers has been the detailed basic study of the separate mechanisms involved in the complete process.

These studies include the theoretical and experimental treatment of the mechanism and kinetics of fuel oxidation, spectra of explosive mixtures, mixing of flameless gas streams, fuel-spray droplet-size distribution, evaporation rate process, and flame-propagation rates in quiescent and flowing combustible mixtures.

The successful completion of these studies will provide theoretical and engineering bases for further improvement in the present combustion chambers which can be proved only with great effort by our present complex experimental methods.



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Consideration of instrument is a separate phase of cockpit standardization. These considerations for best flight instruments



show an immediate proposal (left), scheme for later use (center), and plan for future application (right) under study at Navy



Navy's Design Center. Future installation of the last considered arrangement is the potential instrument in mobile

Cockpit Standardization Assessed

Group representing various segments of aviation field offer opinions on what is needed to promote safety and economy.

By Irving Stone

Pilots are feeling that the growing complexity of aircraft has placed a heavy load on efforts to achieve a reasonable degree of cockpit standardization.

Attainment of this uniformity in cockpit equipment and layout is generally conceded to be simply justified by two factors which vitally affect the economical operation—safety and economy.

Cockpit standardization has created operational hazards which have resulted a significant loss in lives and injuries. And widely differing cockpit planning by various purchasers—even as the same models of aircraft—has slowed production and introduced additional heavy expense.

Shedding views on cockpit standardization were made recently at a joint meeting of the Institute of the Aeronautical Sciences and the Society of Automotive Engineers at New York. A title by Cmdr. Howard M. Avery, Navy representative on the Cockpit Layout Panel of the Aircraft Committee, Maritime Board, brought pointed discussions from a panel of experts composed of representatives of an aircraft manufacturer, the Civil Aeronautics Board, Navy research and aviation.

► **Birdy Problems**—Cmdr. Avery's premise was that the pilot cannot possibly assimilate all the complexities of instrumentation and operation associated with

instruments, controls, communications, navigation, power, radio and traffic. The list of proposed cockpit standardizations now includes over 100 items. Obviously, the basic solution would be to freeze even all "necessary" equipment.

After this the first consideration in the overall approach to eliminate complexity is to simplify the location and movement of controls.

A second factor is the selection of characteristic knob shapes for controls to avoid confusion. These have been divided down to 11 basic configurations.

A third consideration concerns seating of the pilot and his range of movement—important details in discussing fatigue. Studies by the Air Materiel Command have resulted in a plan for a seat arrangement providing for an adjustment of 1 in. forward and 7 in. up as a compromise for pilots of various sizes.

Another important detail is eye line focus for optimum forward sight to control and instruments and eye ease above rear of instruments.

As a basic approach to the problem of cockpit standardization, a guide is being sent out by the Navy and the Air Force in its construction but the limitations are not mandatory.

► **Proposals for Instruments**—The Committee has not yet agreed on a standard instrument panel, but this is the next step in the program.

Proposals for the Services have been formulated for reduction of basic flight instruments in a single-seat craft or in a two-seat plane, with similar instrument layout each pilot.

► **An immediate proposal** consists of two fundamental details of these instruments each. In the top row are an airspeed indicator, direction finder, and standard artificial horizon, or better, use an altimeter, turn and bank, and rate of climb. Altimeter installation includes an automatic direction finder above the turn and bank.

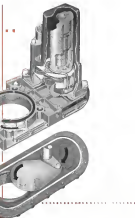
► **A more advanced plan** provides, in the top row, an airspeed indicator, turn and bank, and standard artificial horizon, bottom row, an altimeter, rate of climb, and rate of turn, and standard artificial horizon, and rate of climb. Below the contributions do as a turn and bank.

Cmdr. Avery holds that the plan would spend 60 percent of his time on the Zero Reader and was the other instruments in reduction, the Navy doing for him what his hands could not accomplish conveniently because he could not think, that much.

► **Still another arrangement** for basic flight instruments controlled by the turn and bank is already under study at the Navy's Special Devices Center. In the top row are an airspeed indicator and standard artificial horizon with a blank space between. In a turn and bank, the bottom row has the direction and rate of climb indicators. In the middle of this layout is an instrument referred to as a pictorial directional

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hormone, for easy dissemination of attitude from the cockpit. (It was well noted that this personal device may be in the room.) Is a vertical line with this attitude, and before the bottom row in the back, and how.

In this arrangement, the stick would be to the right side of the panel, lever for power settings to the left.

A stick is included in all of these schemes, located to the right and below the main arrangement. **Other Instrument Factors**—Ease of instrument dial reading is considered an important detail. Space as small as it is between divisions is deemed to be of doubtful relief. Desirable spacing would be 4 in.

The Refin plan for easy dial reading is standardized to have appreciable merit—an oblong main division marking to catch a squared-off pointer so that exact line-up is offset between the two as readily seen.

Lighting of the instrument panel has to be linked before a final layout can be approved. The solution advanced encompasses, first, the choice of lighting, then building the dial to suit the light, and finally deciding the location of instruments.

Candidacy Detachable—A noteworthy element of cockpit evolution was stated to exist in the combination of instruments and controls.

One need to illustrate this condition with that of the pilot who was extracted at Clark from 1900 to 1900 in. He pulled back on the stick to climb, but found that the alternate pointer dropped in going to the highest dial marking. This accidentally combined him, because he was thinking that the pointer should have gone up in a climb. The obvious answer would be to have pointer travel coincide with stick behavior.

Cockpit Location—Another problem attributed with the cockpit, in addition to that of general layout, is where it should be located for greatest safety.

Cockpit Area's design was a solution offered by a Cockpit engineer now working in England. Unconventional as it may seem, he suggests that the cockpit be located in the vertical tail of the aircraft, because the tail is the one part of the plane not generally damaged in a crash, whereas the nose section is most dangerous.

Cockpit Area's base conclusion was that if money and time are to be used in training of pilots and if loss of lives and aircraft are to be minimized, cockpit standardization must be achieved.

William Streight, Reynolds Aviation Corp. engineer, kindly stressed the need for greater consideration of safety in aircraft design.

Commenting on the exact determination of "pilot error" as the cause

of accidents, he said that in many cases "the mistake was built into the plane, just adding their working for the pilot is made it."

As an example of how lack of standardization can bring continual changes to boost the rate and slow production of aircraft, he related how during the development stage of a biplane, 31 alterations were made on the cockpit console for one of two reasons involved. And as would be expected, controls ultimately selected by each airline were different.

Robert V. Gassett, of CAI's bureau of safety investigations, revealed that cockpit standardization in Air Force C-54s and Navy B-24s had contributed greatly to the safety achieved in Berlin airlift operations.

Robert Ayers, American Airlines' assistant director of flight engineering, indicated a rate of control for the general theme of cockpit standardization. He said that if no standardization too much, we will still develop.

Li Coats, George Hoover, whose assignment at the Navy's Special Design Center, Santa Point, Lang, Island, N. Y., is to "design up" cockpit design, stressed the thought that extreme simplification would be required ultimately—in effect no more complication than the pilot gets in his elementary training.

He says the standardization will not be part of the future plan, because at extreme altitude there's nothing for the pilot to see. And even though planes will probably approach as fast that the pilot would be taking eye-see action "as the past." What he probably should have in a large personal display, however, is ample time for efficient response, easily what is happening outside.

Flight Engineer—Status of this crew member was also considered. Cockpit Area held that the flight engineer's status was necessary. He and the pilot "can't fly the engine," because he has too many other considerations to handle him.

He explained that on one B-47, pilot had two dials before him—one each wing. Behind him, the cockpit engineer had an electric fan for individual adjustment of each engine.

Mr. Ayers connected that when the pilot was given a cockpit, after he got to know him he gave him entire responsibility—but also emergency responsibility for each engine.

Now he has another member included in the crew—the flight engineer. Ayers stated that he has been told by many of his pilot acquaintances that they do not accept responsibility for the flight engineer.



FOR COOLER TURBINE BLADES

Newest engine flow conditioner is L-shaped section on top of the inlet ducting of engine developed from superheated heat by ductwork of Mustang Aircraft Co. at Detroit, Mich. Cold Design is needed to aid in reduction of an overall static pressure loss and fuel saving com-

pression chamber to select gas temperature at turbine wheel. Latter objective results that of engine developed by Mustang Aircraft Co. at Detroit, Mich., which shows no heat loss from ducts, even at top speeds. Mustang engine weighs 150 lb., is expected to deliver 250 hp. thrust.

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Madagascar Wildlife W. Africa Company

Address: Wiesbaden, Hof-Expansions-Ges.
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Reviews of domestic and foreign literature

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100

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Aviation Draws Deeply From U. S. Industry

That aircraft manufacturing efforts involve wide segments of the U. S. industrial field is evident in that during 1945 United Aircraft Corp. and its subsidiaries and more than 1,000 subcontractors and suppliers in 36 states

Thus, it is apparent that the "aircraft industry" actually comprises a substantial portion of all U.S. industry, with particular emphasis on small business establishments.

Longest United Aircraft order of subcontractors and suppliers is Pratt & Whitney Aircraft division, which required parts raw materials, supplies and services from some 100,000 firms in 36 states and the District of Columbia. Manufacture of the Tu-160 Wasp JT-48 alone required parts and materials from 143 subcontractors in 16 states.

Hamilton Standard Propeller division selected 144 suppliers in 28 states and the District of Columbia.

Chenier Vought Assault division
and products of 150 machine and tool
drops and gravel substructures in 5
series

Salvatore's Assault division called on 173 subcontractors in 14 states for proposals of helicopters.

Instrument Warns Of Oxygen Lack

A new disease which warns pilots when lack of oxygen becomes dangerous has been developed by the Air Force School of Medicine at Randolph Field, Tex.

It is a small scale "beatmeter" using a diode, an electroencephalograph (EEG), which fits on the head and signals the pilot when beatwave changes indicate that he is affected by hypoxemia.

At 25,000 ft, the time between the onset of hypoxia and the point moment is 270 sec., whereas EHG equipment will warn the pilot within 300 sec., giving him almost 3 min. to act or adjust his oxygen supply.

Experiments with the oxygen sensing device have been successful on 10 out of 107 men tested. Allowing for a slightly greater margin where the device could be ineffective because of individual variations, manufacturers believe the safety feature still will be good enough to satisfy one of the consumer's

Head-electrodes of the next will be incorporated into helmets currently in use. Cables leading from the electrodes will plug into a wearing box in an arrangement similar to that customarily used for amblyopes.

~~WOLF!~~
~~WOLF!~~
~~WOLF!~~

Unfrightened by dire predictions, leaders of American business always have planned with confidence in the future . . . and, in the long run, their faith has paid off. Such courageous leadership helps to create good business.

Good business means jobs for those who want to work. It's the best defense against the terrorists who are working to undermine the individual liberties Americans enjoy.

430



BKF INDUSTRIES, INC. PHILADELPHIA
BALL AND ROLLER BEARING

NEW AIRCRAFT



SO-6020



Dassault Mirage MD-450

Two Jet Fighters Reveal French Design Progress

(McGraw-Hill World News)

PARIS—Two new French jet fighter designs have just completed initial test flights successfully. They are the SO-6020 (photo, this page) and the Dassault company's Mirage, or "Hercules" (photo, next page). Both are powered by British-designed, 5000-lb.-thrust Napco SO-6020 turbojets; a French-made Hispano version, Dassault MD-450 is built by the latter.

Heavy armament characterizes the swept-wing SO-6020. It carries four 30-mm cannons in its 15-mm machine gun in the forward fuselage section,

and carries rocket ammunition for 15-25 sec. of continuous firing—720 rounds shells or 1900 cartridges.

► **Flight Record Feasibility.** Normal fuel capacity is 600 gal., reported to give the SO-6020 a time of 14 hr. without refueling. Provisions have been made to permit quick conversion of the plane for photo reconnaissance work, allowing additional space for 200 gal. of fuel.

Cockpit is pressurized and pilot's seat is ejectable through a cartridge-action mechanism.

No decision has been reported as to when the craft will go into production or how many will be built.

► **What's Expected.**—Estimated performance, at total weight of 17,500 lb., is a top speed of 645 mph. at sea level, 400 mph. at 32,000 ft.; ceiling, 48,000 ft.; climb rate, 155 mph.; takeoff run, 2680 ft.; landing speed, 135 mph.; rate of climb at sea level, 5000 fpm., and at 32,000 ft. 1572 fpm. Estimated time of climb to 32,000 ft. is 40 sec.

Craft's span is 34.9 ft., length 49.2 ft.; wing area, 273 sq. ft.

► **Five Little Locomotives.**—Some operational defect has been disclosed, stem- ming from location of the air intake in the leading edge, directly aft of the nose gear. The airflow and dust

locked up by the wheel to be taken into the air intake. To remedy this condition, it is planned to alter the fuselage to locate the air intake on top of the structure.

► **MD-450 Prospects.**—The lighter MD-450 is considered by many top French armies to be the most promising jet fighter yet to be developed in France. French Air Force is reported seriously considering a substantial order.

It is an unusual low-wing configuration, with most air intake in the nose. Four 15-mm machine guns compose the armament and 100 rounds of ammunition allow 15 sec. continuous

firing. The plane may also be fitted with rockets, and it is assumed line and air. Cockpit is pressurized.

► **Performance.** Data—Estimated performance, at weight of 11,200 lb., is top speed of 600 mph. at sea level, 535 mph. at 30,000 ft., takeoff run, 2500 ft., 2750 ft., flap down, 2130 ft., takeoff run over 50-ft. obstacle, 2500 ft., flap up, 2400 ft., flap down, 2260 ft.; landing run over 50-ft. obstacle, 2500 ft.; rate of climb at sea level, 7000 fpm., at 32,000 ft., 7520 fpm.

Span is 41.6 ft., length 34.7 ft., height 37.3 ft. and wing area 276.9 sq. ft.

Radius of action is reported to be 5 min. of climb and 10 min. of combat at maximum thrust plus 3.6 min. cruising and descent. With supplementary fuel tanks, range is roughly 750 mi. at 10,000 ft.

These two designs are among the more than 15 jet prototypes built in France since the end of the war. France had a lot of catching up to do and tried to do it too fast (Aviation Week, Feb. 23). Result was confusion, and a decision to cut back the aircraft building. Until plans such as these reach production, France will support some jet fighters.



	SO-6020	MD-450
Weight empty...	11,200 lb.	7200 lb.
Fuel load...	2500 lb.	2510 lb.
Armament...	3870 lb. (cannon) 2500 lb. (machine guns) French built	1915 lb. (machine gun) Rohr-Royce None
Engine...	Hispano Napco	Hispano Napco
State thrust at 12,300 rpm...	5000 lb.	5000 lb.
Span...	34.9 ft.	41.6 ft.
Length...	49.2 ft.	35.1 ft.
Wing area...	273 sq. ft.	255.9 sq. ft.
Top speed, alt...	645 mph.	600 mph.
Rate of climb, ft.	5918 fpm.	7600 fpm.



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Balliol Development Work to Continue

(McGraw-Hill World News)

LONDON—Testing of the Balliol II advanced military trainer with Merlin engine has continued despite the crash at Walsingham on Feb. 3 which killed both the chief test pilot, Robert Lindsay Neale, and his assistant, Peter Fildes (Aviation Week, Feb. 23).

The plane which crashed was the first of the Merlin-powered trainers. Second of the type has been flying here since that at the Ministry of Supply is being ground at Beveridge House. A third plane is just about ready to fly.

A so-called pre-production order for a small number of these Balliols (about 25) is being turned out at Bedford-Tyde's Walsingham. Later, RAF has leased from a test pilot for the company's own testing program.

►No Ground Loop—It appears that Balliol II will not encounter the ground in their "competition" with the AV-8B. Advantages to which gets the nod from the RAF is its advanced training phase.

However, loss of the accomplished

light experience of the two pilots is moderately a serious one.

Canada's request on the crash proved nonexistent. Parts of the plane's main engine were found to short-circuit from the plane, leading to the guess that the plane had collided with some object such as a bird, and that the lighter engine's weakness had caused the pilot to lose control.

New Extinguisher Small, Yet Effective

A new, high-efficiency fire extinguisher known as the "1-2-3" has been developed for aircraft use by the Bode Mfg. Corp., 1735 Boston Scientific Building, Philadelphia.

Small size, simplicity and ruggedness characterize the unit. Overall length is 6 1/2 in., diameter 1 1/2 in., and total weight, weighed, 11 oz., making it easy to mount and maneuver. Discharge is 6 to 8 in. long, headed near the tip to produce a control discharge pattern for maximum coverage.

No pumping mechanism is required because contents are self-expelling. Discharge valve is a simple, flexible hose, actuated by a knurled knob and high-pitch screw thread. The hose pipe has a built-in seal of 100 psi.

Primary purpose of this device is to extinguish suspect fires before they develop to the point of requiring large and expensive firefighting equipment. It would be particularly useful to snuff out fires in electrical circuits, against fire in upholstery immediately upon detection. The extinguisher status that, while the "1-2-3" may be used for all types of fires, it is especially effective on Class B fires (flammable liquids).

The extinguishing agent is a blend of methyl bromide and foam, which provides effective firefighting ability down to temperatures below 0° F. This mixture is also prepared to be much more efficient than other common types of extinguishers from a volumetric standpoint, uses much less agent in operation for a given job. This feature also renders it more toxic, because amount of agent expelled is insufficient to cause discomfort or injury to people in the immediate vicinity.

In this connection, it is significant to note that all two oxygen extinguishers made are toxic, including carbon dioxide. However, the products of combustion of any burning material are also toxic. Therefore, even a fire and its poisonous gas can be combated with another toxic material, it is significant that this substance work again.

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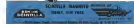
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NEW AVIATION PRODUCTS



Precision Checker

Common surface plate made by Norton Co., Worcester, Mass., for use in toolrooms and inspection departments where precision shims and constant amount clearance require high degree of accuracy, allows three advantages. Because non-elastic, precise flat rate face guaranteed within .0001 in., and continuously smooth surface finish. Its standard flat laboratory test shows greatly extended plate life. Endurable field tests are suited to reveal almost complete absence of wear to plate or gages and instruments used on it, to gather work free from plate warpage, expansion troubles, or distortion under load. Struts press glass surface is not slippery or sticky and is highly suitable for filing. Porous surface combined with exceptional plate uniformity during time required to take readings on its indicator, and accuracy permits exact duplication of readings. Device is non-susceptible, will not rust or corrode under atmospheric conditions, and may be cleaned easily with soap powder and water. Sizes are 5 to 24 in. in diameter.



Non-Marring Studier

Consolidation stud driver and extractor, "B-Way," intended for speed in production, maintenance and repair is distributed by Air Associates, Inc.,

Yerkes, N. J. Device is designed never to mar threads. With shaft and tool pin set in driving position, stud operates in normal collet type stud driver and threads three features—stud depth into collet is fully adjustable without disassembly of tool, extension drive, mounted in torque wrench hole, permits deep or shoulder driving where space is insufficient for standard handle bars, standard collet may be replaced with an offset collet, range of angles, in 30 sec., with handles secured, it becomes power tool for use with air, gas, or electric wrench. 100% pin set in pulling position, it will exhibit no effect on withdrawn necessary torque. Collet clamping action at times decelerates to torque starting the stud.



Sine Stressed in Servo Motor

Designed specially for aircraft instrument operation, new d.c. subminiature type servo motor weighing only 51 cc. and delivering 1/500 hp., accurate constant force plate controls of vacuum tube amplifier. Made by Helmer-Cohet, Inc., 125 Aurora St., Boston, Mass., with R405 (010) is only 1 1/2 in. in diameter and 2 1/2 in. between lugs, and operates on field current of 6 milliamperes, with shunt resistance current of 3 mpa. Operating range is from sea level to 45,000 ft. covering temperature variations from -65 to 160 F. Maximum speed is 14,000 rpm. Motor has two independent high impedance field windings for reversible operation, controls only used in start. Amplifier is separated from separate d.c. source, and its drive mechanism is fully compatible with active operation, air gap between amplifier and field is extremely short. Example of one operating scheme—two field windings are connected into two plate circuits of push pull amplifier. When two plate circuits are in balance, motor is at rest, but when currents are unbalanced, motor will run in a direction and at a speed depending on degree of imbalance.



Sparkplug Cleaner

Designed to fill needs of large production shop or small airport repair station, "Automatic Spark Cleaner," Model 2401, made by H. G. Corp., 136 West 52 St., New York 19, N. Y., removes carbon and lead deposits from nose and shell of spark-plug in single, simple operation. Unit contains built-in filter to avoid hazard of scattering abrasive dust, and only requires connection to standard compressed air line. Gas valve controls abrasive blast and another controls air blast for blowing abrasive out of plug. Special effect nozzle is available for cleaning of long, reach platinum electrode plugs. Company's abrasive compound is made from aluminum oxide.



Helps Ground Mechanics

Antibounce, full wheel, steerable tail wheel unit, Model 1200, specifically designed for Stearns and other light plane aircraft, is announced by Scott Aviation Corp., 277 First St., Longmead, New York. The 5-in. wheel assembly, with pneumatic tire, is represented in solving tricky towing problems encountered on rough fields or in strong crosswinds. It gives extra lift toward tail, when pilot desires—by applying brake to one wheel independently. It prevents slipping, skidding, heavy lateral rudder travel. Action is longer in pushing tail sideways.

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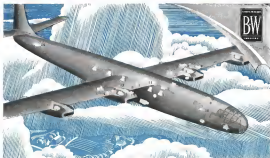


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Today, the jet plane with its higher speeds and consequently greatly increased fuel pressure and capacity requirements, has placed even more emphasis on positive performance.

To meet these new conditions Pesco has developed for jet planes such vital equipment as the high pressure fuel pump—the pump that is only one pump in one of the 36 main pump sets, another pump automatically gives one operation to keep fuel flowing continuously. So important was the development, that America's leading builders of jet engines have standardized exclusively on this Pesco high-pressure fuel pump.

Altogether, there are 17 Pesco products that can be used in 36 places on jet planes. They are listed at the right.

Working hand in hand with the aircraft manufacturer's own engineers, Pesco has kept constant pace with aviation's rapid advances. It is experience and "know-how" that can be of real help to you. Take advantage of it.

*On interconnecting engine planes there are 36 places where Pesco precision equipment is used.

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 - b. Electric Motor-driven Hydraulic Pumps
 - c. Electric Motor-driven
9. Boosting Motors for Control Valves (1)
10. Motors for Brakes & Reverse Wing Gates (2)
11. Wing-actuating Hydraulic Motors (1)
12. Signal-driven Hydraulic Pumps (2)
13. Retention-Under Emergency Hydraulic Pump (1)
14. Retention-Under Boosting Pump (1)
15. Hydraulic Flow Separators (3)
16. Hydraulic Pressure Reducing Valves (1)
17. Hydraulic Pressure Relief Valves (3)



The Election of November 2, 1948 GAVE NO MANDATE FOR SOCIALISM

The President and those who support his legislative program have objected to the substance of my previous editorial, which appeared under this headline: "Now is the Time to FIGHT SOCIALISM in Washington."

In that editorial I explained how Washington is poised to follow the disastrous policy of fleeing industry to ship on new plants and new equipment. That policy landed Britain in the numbing embrace of the Socialists. I cited the experience of Britain to show how such shirking on industrial tools can bring a nation to economic stagnation . . . and Socialism.

The President, in his recent Jackson Day speech, brushed aside this warning . . . "They are again trying to frighten the people with the old worn-out bogeyman that Socialism is taking over in Washington." Senator Francis J. Myers of Pennsylvania asserted that I was guilty of "wastefulness against any reasonable effort to keep our system of free enterprise working."

These criticisms may be sincere. But they are not well-founded.

I want to show why they are not well-founded

by basing this editorial on Washington rather than Britain.

In Washington the Administration has proposed a legislative program, the key parts of which would clearly put the country far on the road to Socialism. Let us see how.

There are two steps in the process:

FIRST: The government by its taxation program undermines private industry so that it cannot provide itself with the necessary new plant and tools.

SECOND: The government itself steps in to provide the plants and equipment that it has blocked industry from getting. That is Socialism.

Here is how Washington is promoting Socialization of the steel industry—and of other industries.

Steel has been expanding its capacity and improving its equipment chiefly by plowing back its profits. During the last three years it has spent \$1.4 billion for new plants and new tools. That was more than the companies had available from their own earnings. But profits provided more

(continued on next page)

than half of that money—more than \$700 million. The remainder came from loans and from depreciation reserves set aside out of the earnings to replace worn-out equipment.

Profits must continue to provide the funds needed to pay for the bulk of the steel industry's necessary expansion. That is because private citizens, their incomes slashed by heavy taxes, have not been willing to buy steel stocks even at prices ridiculously low for the companies and their present stockholders. The stock market currently prices the mills and other facilities of the nation's principal steel-producing companies at far less than fifty percent of the cost of reproducing them.

Let us take another example. Profits are essential to expansion in the electric light and power industry also. This year private companies are planning to buy \$2 billion worth of new plants and equipment. To do that without going overboard in debt, they must sell to the public some \$300 million worth of common stock. A squeeze on their profits would make that sale virtually impossible.

For tens of thousands of small business enterprises profits afford virtually the only practical source of funds for new equipment and expansion.

In the face of these and many other examples that might be cited, what is the most effective way to prevent industry from re-equipping itself and expanding its capacity to meet our essential needs?

Obviously, it is to cut down profits. And that is what the Administration is trying to do. The President has declared that steel prices are too high, and is demanding that Congress raise taxes sharply on all corporations.

There you have the first step toward socializing industry.

Next comes step two. Here the government supply the tools and equipment which, by taxation, it prevents industry from getting.

The Administration has proposed legislation to carry out this second step. It is called the

"Economic Stability Act of 1949," for short, the "Spence Bill."

This bill gives the President the power to provide industrial facilities—in steel, power or any other industry—where he finds that a shortage is hampering or is likely to hamper the economy.

True, the bill says that the government is not to construct new plants if private companies will do it through government loans, on terms prescribed by the President. That may be just one step short of complete socialization. But it is only a short step. And the Spence Bill authorizes the government to take that step.

By itself, the Administration's "Stability Act" sounds harmless enough. It would have the government build plants only as a last resort. But it provides also that if private enterprise cannot turn out all the goods the country needs, the government can and should step in and provide the equipment to do it.

Now, take that power together with an Administration tax program that undercuts the ability of private enterprise to supply the new plants and equipment it needs out of its own earnings. That combination promotes government ownership and operation of industry.

And that is Socialism.

The American people, of course, have the right to live under any system they choose—Capitalism, Socialism, Fascism, Communism, or what-have-you. But before Socialism or any other "ism" is imposed upon us from above, the people should know the facts. If this editorial shall have contributed in some small degree to that end it will have served its purpose.

The election of November 2, 1948 gave us mandate for Socialism.

James H. McGraw, Jr.

President, McGraw-Hill Publishing Company, Inc.



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SALES & SERVICE



Artist's sketch of West two-place personal plane design, powered by small turbo jet, shows new trend. First consumer test of

small, civilian jet planes may come in National Air Race of next few years. Cost can be reduced to as low as \$7000

New Jet Personal Plane Design

Possibilities studied by West Coast firm; baby turbo-jet engine shows up to 318 lb. thrust on test stand.

An experimental two-place personal plane design which would give 900 mph top speed and 375 mph cruise at 12,000 ft. with a range of 500 mi., according to preliminary calculations, is being studied by West Engineering Co., Los Angeles.

Design is an advanced development of the earlier West design of a small turbojet plane with lower performance characteristics.

► **Race Pilot Reaction**—Estimate leaders, controlling top race qualified with speed development of the business firm says, is reported interested in sponsoring the plane project. If the proposed design is built, first tests may be turned over to National Air Race pilots to test three lower models, and to prove West's baby turbojet engine which has shown up to 318 lb. thrust on test stand.

As shown in the artist's sketch, two-jet plane will have a relatively thin wing, structure and low drag fuselage section with pilot and passenger side by side in seats having staggered placement to avoid shoulder crowding in the narrow cabin.

Engine specifications show the plane to weigh 2746 lb., gross, with 1040 lb. of this weight representing fuel load Aerodynamic cleanliness of the design is expected to give a 20-to-1 glide ratio. ► **Qualification**—Ed West, president of West Engineering, says using other specifications figures 2500 ft. takeoff over 50 ft. obstacle at sea level on nar-

row day, 2500 ft./min. climb from sea level, 65 mph stall with flaps, 80 mph stall with flaps retracted, 30-75 mph landing speed, 20 ft. tip in wing landing of landing with normal fuel reserve. Powerplants are two West Engineering Co. turbojets developed from Type B turbo supercharger power from both will be identical only the takeoff and climb, after which cruise will be on one engine.

In support of increasingly optimistic performance expectations, West claims that the design enables the finished aircraft to be considerably cleaner, from standpoint of drag, than the P-50. He told AeroSpace News: "The high take-off performance, and high glide ratio will be one of the biggest design points" (from engine failure) reduces to 1000 to three and one-half seconds with the plane in the hands of a competent pilot."

Members of West's company are confident that the little plane can be produced to sell for as little as \$7000. Airframe, engine accessories, should not cost more than \$2400, according to the 315-hp. rate-of-burn to a base structure weight of 500 lb.

► **Question Mark**—An obvious question mark in the proposition of such a design is engine life and engine purchase cost. "We'll see in the experimental phase of converting superchargers the holds a contract to license 4000 Type B units owned by the Los Angeles war surplus

broken into engines, and an estimate on available on conversion costs or life of the finished product.

While West Engineering's chief objective has been, and still is, the development of a baby turbojet suit to power lightweight Army and Navy radio-controlled target planes, the designing of the personal airplane has been given impetus by interest of several race pilots who have been participants in the Goodysen Trophy aircraft plane race at Cleveland.

One race pilot has told West that he expects that the 1949 National Air Races will be the last to stage Thompson Trophy races for planes of unleaded power in piston and jet races. He believes that after 1949 races, as in the case of the highly popular Goodysen race, will be for aircraft in various power groups and including jets. He informed West that race pilots are considering seriously several plane designs built around the Race and Westinghouse baby turbo as well as West's own engine.

An interesting sidelight of West's engine experiments is his testing of one baby turbojet in an orchard basket for use in food lifts. Preliminary experimental runs indicate that the engine will produce 1,700,000 BTU of heat per ton of fuel as compared with 100,000 BTU delivery from the same quantity of fuel in a "good" standard orchard basket. In fact in a basket the engine is run at 8000 rpm, at which speed the same level is described as "not disturbing."

Portland to Portland

The seventh annual light plane air race of the Portland Chamber of Commerce will take a large group of Oregon business and professional men from Portland, Ore., to its eastern counterparts, Portland, Me. From 40 to 100 privately owned planes will take off May 27 on the trip, to be made in several stages, such stops at Boise, Idaho, Salt Lake City, Utah; Denver, Colo.; North Platte, Neb.; Wichita, Kan.; Indianapolis, Ind.; Akron, Ohio, and Lock Haven, Pa. Arrival at the Maine metropolis is scheduled for May 27.

Visits will be made to aircraft manufacturing plants at Wichita and Lock Haven, where some of the air travelers will take deliveries on new planes. No fuel schedule has been arranged for the return trip, each pilot being at liberty to choose his own route home. Many of the firm plan to be in Indianapolis May 10 to see the 50th anniversary racing clinic.

This will be the longest air reduction by the chamber, although previous times have included trips to Alaska and Mexico.

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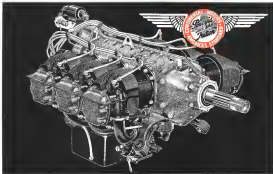


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FINANCIAL

Airline Financial Outlook Clears

Additional mail pay awarded by CAB builds surplus for C&S, and enables UAL to whittle down deficit.

Recent mail awards granted by the Civil Aeronautics Board have made necessary a sharp revision of previously estimated 1948 income losses. Current release of annual reports, giving effect to increased mail pay, make much better reading than preliminary estimates had first indicated.

Along with the surprising influence of sharply increased mail revenues are significant improvements in operating efficiencies as a result of management's own efforts.

► **C&S Profit—Chicago & Southern Air Lines**, among the first to issue a complete report for 1948, reveals a surplus of noteworthy gains. Net income came to \$679,477, as compared to an adjusted loss of \$76,085 for 1947.

Largely as a result of retroactive mail pay awards, applicable to 1946, 1947 and 1948, a surplus deficit of \$1,581,750 was converted into a surplus profit of \$113,755 at year-end. Company's net worth increased from \$3,311,395 to \$5,004,090 in the process.

The company also presents a clean balance sheet. Net worth, despite surpluses of \$1,260,000, was valued during 1948, leaving no indebtedness other than trade accounts. Working capital as of Dec. 31 came to \$1,087,837 with available cash of \$235,144. Its net total current liabilities of \$1,492,731.

► **Depreciation—Flight equipment** and other properties are carried at a depreciated value of \$1,631,691, as compared to an original cost of \$5,119,516. Aircraft equipment (12 DC-3) and five DC-4s. The DC-3s are fully depreciated to a residual value of \$100 cash and the DC-4s are expected to be fully depreciated to a residual value of \$30,000 each by June 30, 1950. In view of higher going prices for this equipment, hidden asset values are present at this amount.

Further, depreciation charges should be materially lower for current year and 1950. This will serve to increase any earnings available during these periods as well as make for higher tax savings. The management displays a conservative attitude toward new equipment which should reflect to the long-range benefit of the company.

► **Went Key Plans—C&S** does not propose to purchase new aircraft at this time. Because of their credit for "new" type of aircraft as thoroughly broken down, operating costs will continue to be high, and the initial cost opposes heavy amortization, interest and insurance charges.

"Also, company believes that with the present available traffic, greater capacity of the new types will result in less frequent schedules. This policy is a critical departure from past practice in the industry when new equipment was bought for competitive reasons at the slightest provocation.

A system of cost control instituted by C&S also appears to have been effective. Total operating expenses were up only 3.6 percent for 1948 over the previous year in the face of a gain of 10 percent in gasoline prices and one-repeating losses for other materials and services necessary to operation.

► **Valuing Trust—Stock** value or stockholders' equity shows a gain of 51 percent, from \$6.80 to \$9.55 per share, at the 1948 year-end. Nevertheless, it is not made at all in the stock market. C&S 1948 annual report, Company shows capital stock consisting of 709,316 shares as outstanding. No reference is made to purchase of voting trust certificates which gives the bulk of these shares.

Actual shares and voting trust certificates are treated as two separate securities in all market transactions and are not interchangeable for delivery purposes. Voting trust arrangements have been used and in respect to present day corporate practice. Utilization at this time in any capital structure does not entail transfer of confidence and places a serious handicap on any contemplated future financing.

► **UAL Deficit—Walter** working 1948 in the red, the management of United Air Lines expresses considerable cheer in the annual report. A deficit first placed above \$1 million in the preliminary 1948 reports is stated to be a net loss of only \$1,270,351, largely as a result of CAB action on mail rates.

With award of \$2,982,000 in retroactive mail pay and provision to absorb costs of the DC-6 grounding, a far better outlook is seen by management

throughout the entire United 1948 account. Last year's results compare with an adjusted net loss of \$5,474,365 for 1947.

United allocated the \$2 million, awarded by the Board as reimbursement of the DC-6 grounding, to 1948 and 1947 income accounts rather than crediting directly to surplus. There is a good loss for the treatment in these cases as to be attributable as a monthly basis, starting January, 1949, and can be directly attributable to specific years.

Accordingly, \$1.5 million allocated to 1948 was a major factor in reducing the loss for that year, although actual only will be moved on a monthly basis during the next few years.

► **Cash Build-Up—United** accumulated cash during 1948 through heavy depreciation charges, amounting to \$10,453,295. This compares to \$5,852,049 for 1947.

As of Dec. 31, 1948, United showed net working capital of \$12,295,461, an improvement over the \$3,587,046 revealed a year earlier. Company had contributions for the purchase of State-owned, and construction of facilities, aggregating \$12.2 million as of year-end. While depreciation charges may generate only during the year, it would appear that, in the absence of additional funds, working capital may be added to increased low levels in contractual obligations are discharged. Moreover, during 1948 the company was called upon to retire \$1,584,900 of its long-term debt in regular amortization. In addition to such current maturities, non-bank loans and debentures amounted to \$12,440,000 as of Dec. 31, 1948.

► **Book Value—Giving effect to the various accounting adjustments, UAL's book value per share on the 1,012,817 shares of common and 16,680 shares of management stock amounted to \$15.16 as of year-end.**

While the corporate affairs show substantial surplus in their individual reports, only when all current have been added back accounting for 1948 will it be possible to see how corporations show relative improvement in significant shares among the industry in a whole.

—Sally Atchard

Stock Transactions

Recent stock transactions, as reported to the Securities and Exchange Commission, include:

► **Of the top three airlines** recently reported to the Board of Directors of Continental, Western and United, the company's net income of \$1,270,351, largely as a result of CAB action on mail rates.

► **With award of \$2,982,000 in retroactive mail pay and provision to absorb costs of the DC-6 grounding, a far better outlook is seen by management**

CAB Head Warns on Subsidies

O'Connell concerned about airline reliance on mail pay; suggests revision in law may be called for.

The scheduled air transport industry, apparently headed for its first profitable year, has renewed warnings about subsidizing that it must not look to government mail pay subsidies for permanent prosperity.

Letter administrator Carl Lynn Callaway, through F.O.C. [Federal Office of Civil Aviation], Jr., less than a month after the Board issued orders providing for multi-million dollar retroactive mail payments which wiped out the domestic trunkline operating deficit for 1949 (Aircraft World, Mar. 7). O'Connell told the industry that if present mail pay subsidy provisions of the Civil Aeronautics Act were to dull the operators' initiative and initiative the way may have to be returned to lower or remove the shield which now protects the companies from the danger of bankruptcy.

Probs Seen in 1949.—The CAB chairman's statement before the New York Bar Association highlighted by a quote that the industry will end this year in a "much stronger position than at any time since the end of the war" (the word considered with an asterisk by Air Transport Assn. Vice President Nathan W. Aynoff) that "the airlines as a group should make money in 1949 according to the best indication so far this year."

During 1949, O'Connell declared, mail pay for domestic trunklines, domestic and U.S. international flag lines may reach \$115 million. This compares with close to \$100 million in 1948.

Not All Subsidies.—The chairman emphasized that much of the total is not subsidy but compensation for services rendered. He said that the "impact of its potential contribution to the U.S. economy, postal service and defense, a well-designed and properly functioning air transportation system would be worth many times the potential level of mail pay." The \$100 million in mail pay last year was only about half the cost of supporting the pace of production, O'Connell noted.

Nevertheless, he emphasized deep concern that the mail pay device may be viewed against development of a sound transportation system of the type and size desired. The chairman repeated here that airline management would make decisions on "business lines." He cautioned the industry to take with "a grain of salt" statements made repeatedly by cost executives that the government is making money off the downstream industry.

Cost Plus.—Designer O'Connell and the design part of 1949, nearly all of the domestic trunklines, federal and international carriers had applications pending before CAB for increased mail rates. This meant that from the day of each carrier's petition the higher mail pay until the Board set a final rate, the companies were in a position to collect from the government all costs (less disallowances) plus a fair return on their investment (usually 3 percent).

The risk, according to O'Connell, is that a carrier is entitled to file a new "protection" petition for higher mail pay if the old rate is found to be established. Thus, a company that projects a guaranteed 7 percent gain to the risk of making more or less than 7 percent, can, at least, secure at the least the gain that it is entitled to get at least in mail pay. The chairman explained.

Joint Action Sought.—"There is undoubtedly some inefficiency and waste in the industry today, for example, that the airlines to cooperate more actively in establishing post terminal and ticket-



CAPITAL SETS GOALS

James W. Austin, Capital Airlines' vice president for traffic and sales, has announced his company is doubling its 1949 mail revenue during 1949, nearly 10 percent above the \$55,700,000 figure reported for 1948. An industry leader in charter work, Capital hopes to do \$1 million worth of business in the field this year, an extension beyond of Capital's domestic expansion, it shows there speaking at a business management and sales conference held recently at Virginia Beach, Va.

ing facilities. But I doubt if it can be demonstrated that the carriers are really inefficient in the efficient running of the terms."

With a fixed 7 percent profit guarantee, the carriers may not be inclined to keep strict control of their cost accounts, notes from one of the executives. He also cautions to ask that unaccountable mailers in shops be eliminated. O'Connell pointed out: "If we do not explore ways in which proper incentives for economy may be provided, our mail bill can be expected to continue to rise, and we may seriously and permanently undermine the economic soundness of our air transportation system because of the steadily rising airfare insurance subsidy to be borne by the consumer."

NAL Shows Steady Earning Increase

Continued flight operations between National Airlines and the Air Line Pilot Assn. have failed to put a cloud on NAL's wartime profits.

With the help of mail pay increases, National has shown steadily increasing earnings following settlement of the month-long ALPA strike last November. Carrier's profit climbed from \$60,885 in December to \$12,232 in January and \$301,624 in February. For the eight months ended Feb. 28, 1949, National had a net loss of \$372,284, compared with a \$1,014,872 deficit for the comparable eight months ended Feb. 28, 1948.

Traffic Cuts Passenger and factors also checked a profitable year in February. The airline's passenger traffic for the year, falling 557 percent against about 40 percent registered during last November.

But the Air Line Pilot Assn. insists that National's earnings picture is still obscured by management policies. ALPA pilots have filed a long list of grievances against the company since the strike, and the union's members have not taken their jobs in NAL cockpit since November 1948, Mar. 7.

Double Payroll Criticized.—ALPA President David L. Belkore states that National had 287 pilots last month, compared with 127 at the beginning of the strike on Feb. 1, 1948. No significant expansion of operations or increase in equipment reflects that addition of 160 pilots, according to ALPA President Belkore.

Reports for 287 pilots apparently are also ALPA personnel hired during the strike. While they are living NAL's planes, the ALPA pilots are receiving base pay from the company under the strike settlement agreement. Belkore has called on ALPA to investigate the costs involved in the airline in the double payroll.

Georgia Line Plans To Use Bonanzas

Atlanta lightplane airline has issued an indirect challenge to conventional freight operations which are under fire because of high loading requirements and low payloads.

Less than two months after Val Air Lines, Mercedes, Tex., and Green Air Service, Albuquerque, N. Mex., opened the CAB facilities to carry interstate traffic in small single-engine aircraft (Aircraft World, Feb. 14), Albany Airways, Albany, Ga., requested authority to fly passenger, cargo and mail between 25 cities in Georgia, Alabama and Florida. The Georgia carrier plans to use four-place Bonch Bonanzas as standard equipment.

Equipment Granted by Traffic-W. L. III, Albany Airways president, asserts that Bonanzas are "the most efficient and adequate equipment for the present kind of air transportation needs in the area." He states that after mail and parcels his company will switch from lightplanes to larger aircraft.

Albany Airways, an affiliate of Albany Airways, has been operating lightplanes on regularly scheduled routes between Jacksonville, Fla., and Atlanta for about two years. Between May 14 and Dec. 31, 1948, Albany Air Service made 662 flights on its 119-mile line, carrying 775 passengers and achieving a 91.8 percent load factor.

Feeder Route Profitable.—Albany Airways wants a certificate to operate between Savannah, Ga., and Montgomery, Ala., via its intermediate points and between Jacksonville, Fla., and Atlanta via its intermediate points. The latter route substantially provides a link, established in Southern Airways, a feeder which has experienced considerable difficulty starting service but which hopes to get underway this spring.

Meanwhile, service operations has developed in Val Air Lines, which request that certificate to transport passengers and cargo of interstate traffic on its interstate route from the Rio Grande Valley in San Antonio and Houston Texas-Texas Airways a conference with Texas Airways and D.C. in the South Texas area. It understands that Val Air's former Newcom after destructive competition because of its over-reliance on direct routes.

Lightplane Operations Challenged.—TTA also charged that Val Air's operations "is not in keeping with the high standards of CAB and CAB regulations regarding carrying of interstate passengers." Lightplane operations were the subject of investigations of the Civil Air Regulations' impact on cargo.

But the lightplane has pointed to the probably large savings in mail pay subsidies that could be achieved if they

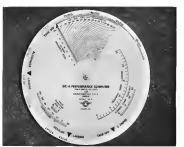
were withdrawn to operate over low traffic routes. In 1948, conventional freighters, most of which used DC-3s, had total operating costs averaging around 30 cents a plane mile and yielded about 60 cents a plane mile mail pay in bond even.

Cost Figures Disputed.—In contrast, Val Air Lines Attorney Henry Bowen charged his company can operate at a total cost of about 15 cents a plane mile. Bonch Aircraft Corp. estimates that its four-place Bonanzas will be operated at about seven cents a plane mile, including costs of fuel, ports (at \$400 a month), depreciation, maintenance and insurance—based on 1200 h a year utilization of the planes.

Eastern Air Lines, which opposes Val Air's application, pointed out that

the Texas company has \$38,361 during the months of operation. Aircraft World, December, 1948. The deficit, EAL declared, was equal to \$14 for each of the 5175 passenger carried by Val Air during the period. Mail pay per feeder passenger carried in 1949 averaged around 52¢.

Other critics of lightplane airline operations argue that as night air in-flight flights would be feasible and that many passengers carrying two engine feeder operations might be located about away single-engine craft even during daylight. They assert that Val Air's figure of 15 cents a plane mile total operating costs does not give realistic consideration to traffic, sales, advertising, general and administrative expenses.



Delta Develops Data Computer

Delta Air Lines has developed a bulky computer for quickly determining information necessary for DC-6 aircraft and loading. The computer is the first test computer ever developed and will offer a substantial saving by reducing errors of cost and amount of paper and calculating was necessary to be accomplished by various personnel.

Developed by John F. Neven, chief engineer, and Robert Dutton of the engineering department, computer is used to determine passenger, cargo and baggage weight and distribution. The type covers most cargo/passenger aircraft now in service that use rotating wheel injection. Weight engineering performance is applicable to the method of solution, however, and will

then engine itself, gross weight, and overhead component, based on effective load length, weight, and outside air weight.

Quantity.—Production—Prototype of the computer was developed and used in Delta's Atlanta, Ga., operations office for DC-6 aircraft. It proved a tremendous aid in determining weight and distribution development was undertaken for use for the DC-6.

The DC-6 aircraft are now in production in sufficient quantity to furnish all Delta DC-6 aircraft and pilots. The type covers most cargo/passenger aircraft now in service that use rotating wheel injection. Weight engineering performance is applicable to the method of solution, however, and will

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Seeks \$21 Million

Northwest Airlines is negotiating for \$21 million in loans which will be used primarily to finance its purchase of ten Boeing Stearman biplanes. The Stearman biplane has been sold to North American Aviation, and the biplane would furnish the remainder.

Discussions coincided with Boeing's announcement that the first of the Stearmans to be delivered to NWA had made its initial test flight. Northwest plans to use the 53.5 million planes on its transcontinental, Hawaiian and Orient routes.

SHORTLINES

► **Air Industries, Inc.—**Has filed CAB for a certificate authorizing passenger, cargo and mail operations over bi-coastal routes in the New York area. Links would extend between La Guardia, Teterboro, Westchester, Newark, Floyd Bennett and Midway airports, between the Grand Central Post Office, New York, and the 30th St Post Office, Philadelphia, from La Guardia and Midway to Long Island points, from Newark and Teterboro to New Jersey points, and from Midway, La Guardia and Westchester to south of New York State and Connecticut points. President Otto Marx, Jr., states his company would use Sikorsky S-51 as other suitable equipment to conduct the operation.

► **American—**Continued to set winter traffic records during February, with average passenger mileage up 47.5 percent over February, 1965 (when DC-8s were grounded). Freight was up 35 percent to 1,973,529 ton miles, and mail volume jumped 66 percent but cargo ton mileage of 505,322 was down 5 percent from levels in February, 1965.

► **KLM—W3** increase its New York-Amsterdam flights to seven weekly on Apr. 4 and to nine weekly flights on May 16.

► **National-CAR** has denied Colonial Airlines' request for postponement of airline proceedings in the NAL dismemberment case, pending investigations of the possible effect of actual and proposed NAL stock purchased by W. R. Grace & Co. and Pan American Airways, and of interchange agreements involving National, PAA, Panagra and Eastern Air Lines.

► **Northwest—**A Presidential emergency board has settled a dispute between NWA and the International Association of

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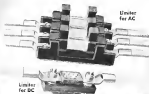
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Michigan. Flight instructor's salary was increased \$17.50 a month for the period July 1, 1948, to Dec. 31, 1948, and another \$7.50 a month starting Jan. 1, 1949. Other personnel represented by IAM received retroactive increases of up to 101 cents an hour.

► **Powers**—Lost \$59,932 during the first two months of 1949, compared to a loss of \$55,707 in the same period last year.

► **Seaboard & Western**—A CAB enforcement attorney participating in TWA's complaint against the aircraft control center's recurrent operations has asserted that SWW's letter of resignation should be rescinded and the company should be ordered to cease and desist from engaging in an investigation. The attorney said Seaboard & Western has intentionally and knowingly violated the Civil Aeronautics Act. He added that the company's entire operations, including those allegedly conducted under contract, were actively conducted in violation of the act.

► **Southwest Airlines**—Has named Hugh M. Dorn, former chief pilot and current operations manager of Robinson Airlines, as operations manager. Southwest plans to begin feeder service this spring.

► **Southwest Airlines**—Has received a \$45,000 Navy Dept. contract for overhaul and modification of government aircraft engines.

► **United-CAB** has discussed IAA's membership raising suspension of all coach traffic, recently played an effort by Capital Airlines and Northwest Airlines.

► **Western Electric** Apr. 1 began operating all flights on its control device with Comair-Int'l. — Comair has inaugurated daily morning service between the Twin Cities and Denver.

CAB SCHEDULE

- Apr. 1—Philadelphia conference on direct commercial routes from Seattle (Docket 2445 at 30).
- Apr. 4—Hearings on Board's investigation of diversion on flight emergency rules, suspended from Mar. 28 (Docket 1161 at 30).
- Apr. 15—Hearings on Board's investigation of aircraft service and interline agreements at St. Louis and Montreal (Docket 1412).
- Apr. 16—Hearings on Chicago & Southern Air Lines' application for extension of route from Chicago to St. Louis and Springfield, Ill. (Docket 1413).
- May 4—Hearings on proposed Canadian air line (Docket 1414 at 30).
- May 10—Hearings on additional air line transportation service (Docket 1110 at 30).
- May 16—Hearings on Hughes Fuel Co. contract of TWA (Docket 1414).

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EDITORIAL

Working Toward Sound Air Transport

Frequently critics of the air transport industry's economic policies, the chairman of the Civil Aeronautics Board has gone on record with a warning that we cannot "continue along the same lines in which we have been moving, since the net, no matter how constraining to the airlines that course of action might be."

Chairman Joseph J. O'Connor, Jr., pointed out to the Association of the Bar of New York City that unlike even other public utilities, the industry could not meet the financial consequences of its own overproduction because the governmental means for aid.

In short, Chairman O'Connor stated the industry must get down to sound economic practices demanded in any other business.

This point, and the industry's frequent unwillingness to hear hard business facts or permit any assessment to live also try to, have been stressed by this page since *AirlineWeek* was established in 1947.

There has been some resistance in the industry because of the government's official policy, especially among those who felt that the present law and subsidy provisions could be continued forever. Aviation Week has always maintained that the industry was a grave risk of killing the goose that laid its golden egg, unless it made honest effort to cut, instead of always increasing, its demands for public money. Lending, rather than helping, industry opinion is a noble objective for a business magazine, but it had better expect bitter cries from those it is trying to help.

New it is the chairman of the CAB who urges the industry to adopt economic policies.

Chairman O'Connor believes "we can and will succeed in strengthening and a healthy industry in which air transportation can move forward on sound economic lines," but indicates that will not be possible without "successes" for the carriers. In other words a line with a few additional teeth is necessary to make economic success more expensive to the carriers than it has been in 1955.

Mr. O'Connor details if the airlines are unashamedly self-interest but questions whether they are concerned, pointing out the example that the present act in Section 405(b), requires that their subsidy resources spent liberally provided they are "honest, economical and efficient." If air capacity, safety and finances in instances where economic incentive is lacking.

"If we do not seek to explore the ways in which these incentives can be changed, our air and pay bill can be expected to continue to rise, but what is far more important, we may seriously and permanently undermine the economic soundness of our air transportation system because of the stupor of the ability of industry management to believe his business men," the chairman said.

"The significant problem . . . is the effort which subsidy, great or small, may have on the airlines and whether in using the device of mail pay we are working toward a sound air transportation system of the type and size we want. Because I believe that the success of our economic system lies in the freedom of large numbers of business men to make and execute sound economic decisions, it might say my staff members ever said pay is whether or not it leads to the same.

opponent to behave like business men and to make these decisions as business men normally do."

"I can not see that some of our air carriers have an economic advantage . . . and I believe there is a very definite relationship between what I would call a lack of economic management and the various aspects of air mail pay and subsidies."

"The usual economic consequences of overproduction in industry and other public utilities that do not impose an airline management. The inevitable result has been, in my opinion to be, the operation of excess capacity the same of which are borne by the government."

Speaking of routes, the chairman complained that "a carrier is virtually assured that the government will make up any losses involved in operating a given route pattern, provided there is not flagrant over-scheduling. . . . If it, of course, the responsibility of CAB to lay out and maintain a sound and economic route pattern, but the . . . carriers are not likely to want as long as they are not provided with any economic incentive for so doing."

"What I have said . . . applies with equal force to . . . interchanges. Most of these that have been presented to the Board are based not upon a series of economic decisions but rather as deliberate schemes in an arbitrary proceeding."

The extent to which these proposals make economic sense is partly incidental. . . .

"What incentives are there either in the Act or in our mail rate action which make it imperative and compelling upon the carriers to finance themselves in the accident conceivable way so that they will not only have adequate funds to meet their capital obligations, but also so that their capital structure may be reasonably diversified?"

"The record of the growth of airline debt since the war is almost irrefutable evidence of the lack of such incentives. In large part this incentive has been removed because the present act tends to operate in a shield between the air carrier, and the ultimate in economic penalties—bankruptcy."

"Bankruptcy is, after all, in private enterprise the principal safeguard that we have for making sure un-economic opens doors. In the air transportation business, as it is conducted today, this safeguard is no stronger than water."

"It seems to me that because of the facts and perhaps also because the Board has no power to regulate the airlines' security issues, the financial structure of many of our air carriers have deteriorated to a remarkable extent."

In discussing CAB's ultimate economic interpretation program for 1956, Mr. O'Connor said differentiating between mail pay that is subsidy and that which represents fair compensation is needed by the Post Office, Congress and the people so they "can tell the cost of supporting the air transport system" and needed by the airlines "in order to keep them under constant pressure to achieve self-efficiency."

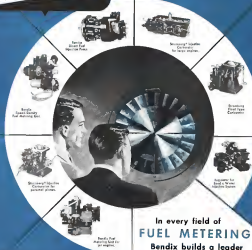
Between the two undesirable avenues of continuing on the present basis, or taking the more-or-less approach to subsidy, the chairman believes there is the road "we must follow if we are to continue the development of an air transportation system which is privately owned and managed and which rests on a sound economic foundation."

ROBERT H. WOOD

AVIATION WEEK, April 8, 1949

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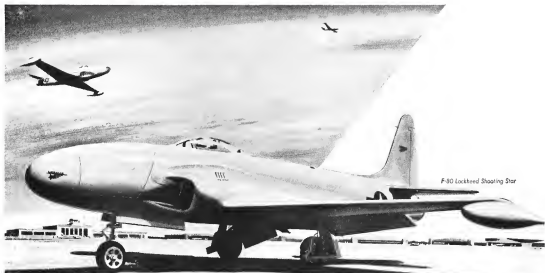
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